

IN THE CLAIMS:

53. An optical system for detection of anomalies, such as particles or pattern defects, on a surface comprising:

an optical source providing a beam of radiation illuminating the surface;

a number of detectors, said number being more than two;

a plurality of optical elements collecting radiation scattered from the surface along channels and directing the collected and scattered radiation to the detectors, causing the detectors to provide output signals in response thereto, said channels disposed about a circumference of the surface so that each of the detectors sense radiation scattered from the surface in directions different from those of radiation sensed by the other detector(s);

a device causing relative motion between the beam and the surface so that the beam is caused to illuminate different parts of the surface and so that the detectors provide output signals in response to radiation from different parts of the surface illuminated by the beam, said device comprising an acousto optic deflector;

a storage storing said detector output signals; and

a processor processing information from said stored detector output signals concerning radiation scattered from different parts of the surface in different directions from the detectors for identifying anomalies.

54. The system of claim 53, said source supplying a beam of polarized radiation illuminating the surface.

55. The system of claim 54, said source supplying a beam of S or P polarized radiation illuminating the surface.

56. The system of claim 55, said elements collecting radiation scattered in directions away from any normal direction to the surface.

57. The system of claim 56, wherein said detectors are positioned symmetrically in the azimuth.

58. The system of claim 53, said channels disposed symmetrically about the circumference of the surface.

59. The system of claim 53, wherein said channels collect scattered radiation at elevation angles in the range of about 3 to 30 degrees from the surface.

60. The system of claim 53, said channels disposed symmetrically in the azimuth with respect to the beam of radiation.

61. The system of claim 53, said detectors disposed about the circumference of the surface.

62. An optical method for detection of anomalies, such as particles or pattern defects on a surface comprising:

illuminating the surface using a beam of radiation;

collecting along channels radiation scattered from the surface and directing the collected and scattered radiation to a number of detectors, said number greater than two, causing the detectors to provide output signals in response thereto, said channels and detectors disposed about a circumference of the surface so that each of the detectors sense radiation scattered from the surface in directions different from those of radiation sensed by the other detector(s).

causing relative motion between the beam and the surface so that the detectors provide output signals in response to radiation from different parts of the surface illuminated by the beam, wherein said causing is by means of a device comprising an acousto optic deflector;

storing said detector output signals; and

processing information from said stored detector output signals concerning radiation scattered from different parts of the surface in different directions from the detectors for identifying anomalies.

63. The method of claim 62, wherein said illuminating supplies a beam of polarized radiation to illuminate the surface.

64. The method of claim 63, said illuminating supplying a beam of S or P polarized radiation to illuminate the surface.

65. The method of claim 62, wherein said collecting collects radiation scattered in directions away from any normal direction to the surface.

66. The method of claim 65, wherein said collecting and directing direct radiation to detectors that are positioned symmetrically in the azimuth.

67. The method of claim 62, wherein said collecting and directing direct radiation to detectors positioned at elevation angles in the range of about 3 to 30 degrees from the surface.

68. The method of claim 62, wherein said collecting collects along channels disposed symmetrically about the circumference of the surface.

69. The method of claim 62, wherein said collecting collects along channels disposed symmetrically in the azimuth with respect to the beam of radiation.